GW - 32

REPORTS

YEAR(S):

Dye TRACER STUDY

2006

Trihydro CORPORATION

October 13, 2006

Ms. Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe, NM 87505

RE: Responses to NMED comments of the Ciniza Refinery Dye Tracer Study

Dear Ms. Monzeglio:

Giant Refining, Ciniza Refinery (Refinery) submitted a report entitled "Dye Tracer Study 2006" (Report) to the New Mexico Environmental Department (NMED) in late June 2006. This report detailed a study, conducted in April 2006, that utilized dye to determine if a cross-connect existed between the process and storm sewer systems at the Ciniza Refinery. The NMED commented on the Report in a letter to Mr. Ed Riege dated August 14, 2006. The correspondence included eight comments regarding the methods and procedures used in the Dye Tracer Study. The purpose of this letter is to respond to the comments in the NMED correspondence.

NMED Comment "A."

The dye study was conducted during a facility turnaround, which introduces a variety of different variables (e.g., low wastewater discharge conditions) that can yield different results than if the dye study was conducted when the facility was operating at full capacity with all processing units operating and water constantly flowing through the sewer systems.

Response to NMED comment "A."

Trihydro understood that the Refinery would be undergoing turnaround and that some units may not have had adequate flow through the process sewer system. Inadequate process sewer flow, for a dye tracer study, can be the result of a turnaround or normal refining operations. Therefore, water hoses were utilized to provide more than sufficient flow to carry dye through those sections of sewer where flow was not adequate. Water hoses were also used to create sufficient flow in the storm sewer because dry weather conditions during the course of the study prevented storm flow through the storm sewer system.

NMED Comment "B."

The Permittee observed "green oil" during the dye tracer study (the dye did not fluoresce when visually examined under ultraviolet light (UV) light) in the stormwater sewer system, which was thought to be slurry from the [Fluid Catalytic Cracking Unit] FCCU. The Permittee states in the conclusions section of the Report that "it was determined that green-colored antifreeze/coolant or gas oil was sometimes present in the storm sewer system." The final source of the "green colored oil" was never identified or further discussed in the report. The presence of the "green oil" signifies some type of cross-connect, leak or spill into the stormwater sewer system or it would not be present.

Response to NMED comment "B."

Trihydro partially concurs with NMED regarding the presence of "green oil" in that it signifies a leak or spill entering the storm sewer drains. It is not possible at the time of the study to determine the source of the above-ground leak or spill that occurred during the dye tracer study. However, Giant strongly suspects a storm sewer drain in the FCCU unit was the point of entry for the leaked liquid because it is located near a filter pot that filters the green slurry oil. The leak or spill was most likely temporary because the green substance was not observed in all samples collected during the study. Giant has since sealed off the storm sewer drain in the FCCU area where the green slurry oil likely leaked during the dye tracer study.

During a subsequent visit to the Ciniza Refinery, green colored oil was observed in the Fluid Catalytic Cracking Unit (FCCU). The FCCU was undergoing a turnaround during this visit and thus bundle exchangers were being cleaned and pumps were being drained. Figure 6 is a photo, taken during a site visit in September 2006 that shows green oil residue on an FCCU pump process drain. Green oil was also observed at the bundle cleaning pad. Bundle exchangers were being cleaned using high pressured fire water. Thus, the green color was only due to the green oil. Operations personnel were interviewed and the green oil was confirmed to be slurry oil.

Additionally, as described in section 3.8 of the Report, test samples were created. Several test samples were used to determine how a sample would fluoresce with different dye dilutions. When the "green oil" samples were compared to the different dye dilution test samples, the color of the "green oil" did not match the color of any of the test samples. The "green oil" samples were compared to the test samples with and without the aid of UV light. Further the "green oil" did not fluoresce and thus could not have been introduced into the storm sewer as part of the dye tracer study. The presence of the green oil is irrelevant to the dye tracer study because it could have entered the system from surface drains.

NMED Comment "C."

The Permittee states in Section 3.3 that red dye was used to determine if any cross-connects existed in the Alkylation unit. Since no red dye was detected visually, it was believed no cross-connects existed. During this test "green oil" was observed visually in the lines, which did not fluoresce under UV light. However, the Permittee never determined the source of this "green oil" either. Until the source of the "green oil" is verified, it would appear some type of cross-connects or leaks exists within the Alkylation unit or elsewhere.

Response to NMED comment "C."

Trihydro partially concurs with NMED regarding the presence of "green oil" in the storm sewer system near the Alkylation unit. Trihydro believes the green oil signifies a leak or spill entering the storm sewer drains. For reasons explained in the report and this response in this letter, Trihydro believes that cross connections are not an issue. It is not possible at this time to determine the source of the above-ground leak or spill that occurred during the dye tracer study. However, Giant strongly suspects a storm sewer drain in the FCCU unit was the point of entry for the leaked liquid because it is located near a filter pot that filters the green slurry oil. The leak or spill was most likely temporary because the green substance was not observed in all the samples collected during the study. Giant has since sealed off the suspected storm sewer drain in the nearby FCCU unit that was the likely source of the leaked green slurry oil.

For further explanation please see Response to NMED comment "D."

NMED Comment "D."

Inspections and reporting of the cross connection between the stormwater sewer system and the process sewer system were inconsistent. The New API Separator (NAPIS) was not sampled each time a unit was checked to ensure the dye had reached the process sewer effluent (if it was checked at each unit, this was not always stated in the Report). The Permittee does not mention, in Section 3.3 (Alkylation Unit), the collection of samples from NAPIS; however, the Permittee does mention, in Section 3.4 (Treating Unit), the collection of samples from the NAPIS to verify that dye had reached the process sewer effluent.

Response to NMED Comment "D."

The NAPIS was not sampled as each unit's sewer systems were checked for cross-connects. However, the NAPIS was sampled during the initial and second dye test of the entire sewer system (sections 3.1 and 3.2). The NAPIS was also sampled when testing the units farthest downstream (or just upstream of the NAPIS) for cross-connects. Therefore the NAPIS was sampled when testing the Isomerization (Isom), Naphtha Hydrotreating Unit (NHT), and Treating units. Once these sewer systems sections were conclusively cleared for the possibility of cross-connects, it was considered unnecessary to sample that far downstream (the NAPIS) when testing the remaining units. The downstream section of the sewer

system was considered free of cross-connects because they are simple straight-runs that are separated by considerable distance with no cross connect. This was verified further by a Giant employee familiar with the storm sewer installation and present while the downstream portion was installed. Therefore, for other units, it was only necessary to ensure the dye had left the process unit. After it was determined the dye was leaving the process unit, the storm sewer was observed for the presence of dye.

The sampling activities were detailed in Appendix A of the Report. Appendix A from the Report is summarized in Table 1 attached to this letter for clarification of sample locations and times. Table 1 lists the locations where dye was introduced into the system, time the dye was introduced into the system, location of storm sewer observation, time of storm sewer observations, results of observations, time of samples collected, and results of sample analysis with UV light.

NMED comment "E."

The amount of time spent to observe the dye flowing through the system is unclear. Only the time the dye entered the system was recorded. The Permittee does not describe how specific time lengths were selected to check for the appearance of the dye in the stormwater sewer system at specific locations. For example, stormwater sewer MH17 was observed for approximately 30 minutes after dye was introduced into the Gas Concentration Unit and since dye did not appear, it was assumed there was no cross-connect. The Permittee does not assert the possibility that dye could have reached the storm sewer or leaked elsewhere or that the dye may not have reached the stormwater sewer system after 30 minutes due to an unforeseen obstacle and therefore was never observed.

Response to NMED comment "E."

The sampling activities were detailed in Appendix A of the Report. Appendix A from the Report is summarized in Table 1 attached to this letter for clarification of the time spent observing for the presence of dye in the process and storm sewer systems. Table 1 lists the locations where dye was introduced into the system, time the dye was introduced into the system, location of storm sewer observation, time of storm sewer observations, results of observations, time of samples collected, and results of sample analysis with UV light.

The time lengths selected to check for the appearance of dye was determined by the flow through each sewer and the proximity of the dye introduction location to the downstream storm and process sewer test locations (e.g. NAPIS and MH17). For example, it would take less time for dye introduced into the Treating Unit to reach the NAPIS and MH17 in comparison to the time for dye introduced into the Alkylation Unit to reach the NAPIS and MH17 (see Figures 1 through 5).

Additionally, if adequate flow did not exist in a sewer (process or storm), water hoses were used to create enough flow to carry dye through the sewer. Flow was verified by observation at the downstream

manhole and before collecting samples for analysis by UV light. To conclusively determine whether a cross connection existed, the storm sewer locations were observed until the dye would have reached the location, based on flow rates, if there was a cross-connect. Trihydro is confident obstacles did not exist because measures were taken to ensure there was sufficient flow through the systems (with water hoses) to carry the dye all the way through the sewer.

NMED comment "F."

NMED understands approximately 25,000 gallons per week of back-flush water (non-contact cooling water and heat exchanger) flows are entering into the OAPIS. However, this does not appear to be the total flow that was entering into the OAPIS during the dry period. The Permittee must explain how the non-contact cooling water and heat exchanger back-flush flows and process water will be distinguished from one another and identify the sources of other continuous flows observed in the OAPIS in the past year.

Response to NMED comment "F."

Heat exchanger back-flush water is a type of non-contact cooling water. Other types of non-contact cooling water would include rain and steam condensate. Unfortunately, it is not possible to distinguish the types of non-contact cooling water from one another. The sources of non-contact cooling water that entered the system during the dry period have been identified as back-flush water and steam condensate. The steam condensate locations were identified in the Report in Table 2.

Other sources of liquid (other than non-contact cooling water) entering the storm sewer system during the dry period was most likely due to inadvertent flows due to maintenance procedures that were followed incorrectly. These have been addressed and Ciniza is currently working to correct maintenance issues.

NMED comment "G."

It is unclear from the Figures provided in the Report where the process sewer system is in relation to the stormwater/non-process wastewater sewer system. An overlay map showing the two sewer systems would be beneficial. (e.g. it is not clear where MH17 in Figure 2 would appear in Figure 1).

Response to NMED comment "G."

Please see Figure 1 attached to this letter. Figure 1 shows the process sewer drain locations and the stormwater sewer drain locations on a Master Plot Plan of the Ciniza Refinery. The process sewer is designated by magenta lines and the storm sewer is designated by black lines.

NMED comment "H."

The Permittee must complete the last sentence found on page four of the cover letter titled "Sewer Training Outline." The sentence that ends with "and that."

Response to NMED comment "H."

Ciniza Refinery personnel have corrected the Sewer Training Outline and include it as an attachment with this letter.

Summary

Trihydro was fully aware of the operating condition of the Refinery at the time of the dye tracer test. Substantial effort was expended to counter these conditions and produce reliable test results. The final result of the dye tracer study is that sub-surface sewer cross-connections do not exist.

Currently, there are several storm sewer drain locations at the Refinery where it is possible for dry weather wastewater to drain into the storm sewer system. The Refinery is currently evaluating alternative methods of managing storm water and process waste water including an option to collect storm water in two large existing tanks that were installed for intended use as oil-water separators. However, the new API separator (NAPIS) was installed as the ultimate oil-water separation system and the two large tanks are currently unused. Accumulated stormwater would then be metered from the tanks into the NAPIS and benzene strippers for treatment prior to discharge into the Refinery's lagoons. The tanks would be piped such that process water could be diverted to them temporarily in the event of a malfunction at the NAPIS. Once the NAPIS is repaired the process water would then be routed back to the NAPIS.

If you have any further questions or comments please do not hesitate to contact either Mr. Jim Lieb or Mr. Ed Riege at 505-722-3833.

Sincerely,
Trihydro Corporation

For: Calvin Niss
Vice President

Regina Allen
Project Manager

072-003-001

cc: Ed Riege - Giant
Jim Lieb - Giant
Steve Morris - Giant
Carl Chavez – New Mexico Oil Conservation Division

TABLES

Table 1: Dye Trace Study Timeline of Activities
Ciniza Refinery, Giant Refining, Gallup, New Mexico

Unit	Time	Dye Introduction Location / Sample Activity	Dye Amount	Dye Color	Sample Observation Unaided by UV Light	Sample Observation Aided with UV Light	Flow
April 18, 2006: Initial Dye Trace Study of Entire Sewer System							
Dye Introduction Locations							
FCCU	1343	Sewer hub near F-P4 sewer bell (LCO Pump)	2 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box F1
Alkylation	1355	Sewer hub near AE44	3 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box A1
NHT	1355	Sewer hub near H-V3 Reactor	2 ounces	Green	N/A	N/A	Adequate flow from process drains to ensure dye disbursement throughout the process sewer system
Gas Con	1400	Sewer bell near G-P6 pump base	2 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box G1
Treaters	1410	Sewer bell just east of PSV-26	2 ounces	Green	N/A	N/A	Adequate flow from process drains to ensure dye disbursement throughout the process sewer system
Observations							
Junction Box C10	1440	Junction box observed beginning at 1440	N/A	Green	Dye was not observed	Dye was detected	Adequate flow from process drains to ensure dye disbursement throughout the process sewer system
MH17	1540	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
NAPIS effluent	1555	NAPIS effluent was sampled	N/A	Green	Dye was not detected	Dye was detected	Adequate flow from process drains to ensure dye disbursement throughout the process sewer system
OAPIS	1600	OAPIS was sampled	N/A	N/A	Unconfirmed due to interference	Unconfirmed due to interference	Adequate flow from unidentified sources
NAPIS influent	1620	NAPIS influent was sampled	N/A	N/A	Unconfirmed due to interference	Unconfirmed due to interference	Adequate flow from process drains to ensure dye disbursement throughout the process sewer system
April 19, 2006: Second Dye Trace Study of Entire Sewer System							
Observations							
MH17	0830	MH17 was sampled prior to introducing dye	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
Dye Introduction Locations							
Alkylation	0932	Sewer hub near AE44	8 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box A1
FCCU	0933	Sewer hub near F-P4 sewer bell (LCO Pump)	8 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box F1
Gas Con	0938	Sewer bell off of the G-P6 pump base	8 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box G1
NHT	0944	Junction box near Reactor H-V3	8 ounces	Green	N/A	N/A	Adequate flow was already present in box assuring dye disbursement throughout the process sewer system
Platformer	0947	Sewer hub near P5A Stabilizer Reflux Pump	8 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box P4
Isom	0958	Sewer near profac bottoms (IV11)	8 ounces	Green	N/A	N/A	1-2 minutes with water hose to ensure dye reached Isom manhole
Treaters	1000	Sewer bell just east of PSV-26	6 ounces	Green	N/A	N/A	Adequate flow from process drains ensuring dye reached junction box Q1
Observations							
Junction box C2	1045	Junction box C2 was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1110	MH17 was sampled	N/A	N/A	Sample appeared orange	Light green hue	Adequate flow from unidentified sources
Aeration ponds	1100	Aeration ponds were sampled	N/A	N/A	Dye was detected	Dye was detected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
OAPIS effluent	1125	OAPIS effluent was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
OAPIS effluent	1435	OAPIS effluent was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
OAPIS effluent	1442	OAPIS effluent was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
April 20, 2006: Alky and Treating Units							
Dye Introduction Locations							
Alkylation	0826	A-V24 sewer drain hub	8 ounces	Red	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box A1
Alkylation	0827	Sewer hub near AE44	8 ounces	Red	N/A	N/A	1-2 minutes with water hose to ensure dye reached junction box A1
Observations							
MH17	0845	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
MH17	0900	MH17 was sampled	N/A	N/A	Dye was not detected	Light green hue but no red dye	Adequate flow from unidentified sources
MH17	1015	MH17 was sampled	N/A	N/A	Red hue was detected	Red hue did not fluoresce	Adequate flow from unidentified sources
Aeration Pond #1	1032	Aeration Pond #1 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
OAPIS	1040	OAPIS was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
NAPIS influent	1047	NAPIS influent was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1300	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
Dye Introduction Locations							
Treating	1442	Drain near PSV-26	16 ounces	Orange	N/A	N/A	Adequate flow from SR Water Wash ensuring disbursement throughout the process sewer system

Table 1: Dye Trace Study Timeline of Activities
Ciniza Refinery, Giant Refining, Gallup, New Mexico

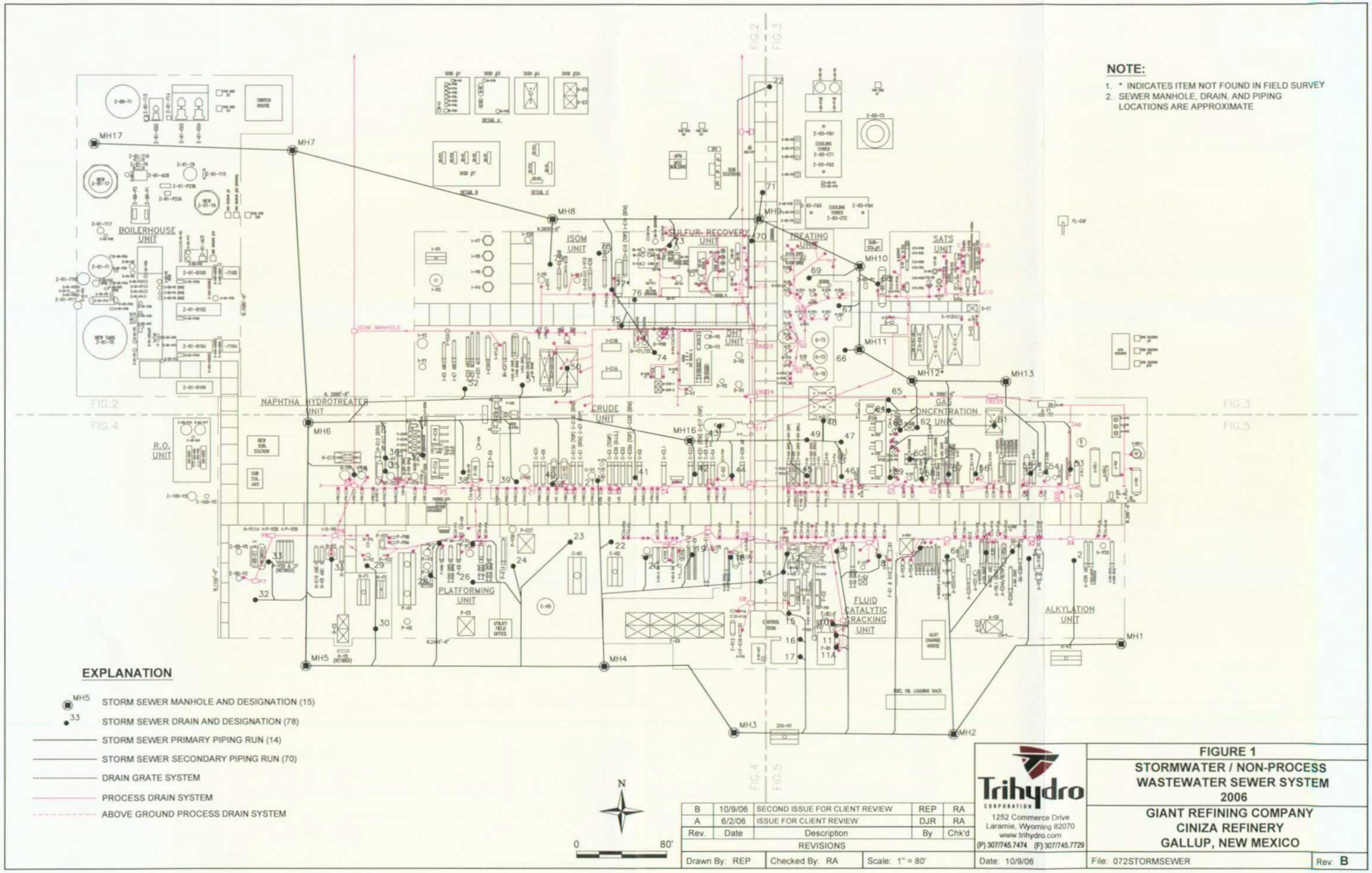
Unit	Time	Dye Introduction Location / Sample Activity	Dye Amount	Dye Color	Sample Observation Unaided by UV Light	Sample Observation Aided with UV Light	Flow
Observations							
MH17	1454	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
NAPIS influent	1500	NAPIS influent was sampled	N/A	N/A	Dye was not detected	Orange fluoresced under UV light	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Dye Introduction Locations							
Treating	1525	Additional dye added to drain near PSV-26	48 ounces	Orange	N/A	N/A	Continuous flow from SR Water Wash ensuring disbursement throughout the process sewer system
Observations							
NAPIS influent	1548	NAPIS influent was sampled	N/A	N/A	Dye was not detected	Orange dye fluoresced	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
NAPIS influent	1555	NAPIS influent was sampled	N/A	N/A	Dye was not detected	Orange dye fluoresced	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1550	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
MH17	1606	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
MH17	1612	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
April 21, 2006: Isom/NHT and FCC Units							
Dye Introduction Locations							
Isom	0757	Drain hub near Prefac Ovrhd Accum. (IV6)	32 ounces	Red	N/A	N/A	Intermittent flow with water hose to ensure dye reached Isom manhole
Observations							
NAPIS influent	NR	NAPIS influent was observed	N/A	N/A	Dye was not observed	Sample was not collected	It was determined flow was not adequate to move dye through the process sewer system
MH17	NR	MH17 was observed	N/A	N/A	Dye was not observed	Sample was not collected	It was determined flow was not adequate to move dye through the process sewer system
Isom manhole	0950	Isom manhole sampled	N/A	N/A	Dye was detected	Green dye fluoresced brightly	It was determined that the residual green dye was from the NHT and Isom units
Dye Introduction Locations							
Isom	1205	Drain hub near Prefac Ovrhd Accum. (IV6)	32 ounces	Red	N/A	N/A	Adequate flow from water hose to ensure dye reached the Isom manhole
Observations							
Isom manhole	1220	Isom manhole was observed	N/A	N/A	Green dye was observed	Sample was not collected	Green dye was observed flowing from Isom and NHT units
Isom manhole	1255	Isom manhole was observed	N/A	N/A	Red dye was observed	Sample was not collected	Red dye was observed to be flowing from the Isom unit.
NAPIS influent	1315	NAPIS influent was sampled	N/A	N/A	Dye was not observed	Green dye fluoresced brightly	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1315	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
Dye Introduction Locations							
FCC	1538	Drain hub near F-P4 LCO Pump	16 ounces	Red	N/A	N/A	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Observations							
Junction box F1	NR	Junction box was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Junction box F2	NR	Junction box was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Junction box F3	NR	Junction box was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Junction box C10	1627	Junction box C10 was sampled	N/A	N/A	Dye was detected	Red dye fluoresced brightly	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1700	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
April 24, 2006: Alky Unit							
Dye Introduction Locations							
Alkylation	0843	Sewer hub near AE44	32 ounces	Green	N/A	N/A	Adequate flow from water hose to ensure dye reached junction box A1
Observations							
MH17	0945	MH17 was sampled	N/A	N/A	Dye was not detected	Light green hue	Adequate flow from unidentified sources
Junction box CBZ-25	1100	Junction box was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
Junction box CBZ-21	1100	Junction box was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout the process sewer system
MH17	1057	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
MH17	1150	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources

Table 1: Dye Trace Study Timeline of Activities
Ciniza Refinery, Giant Refining, Gallup, New Mexico

Unit	Time	Dye Introduction Location / Sample Activity	Dye Amount	Dye Color	Sample Observation Unaided by UV Light	Sample Observation Aided with UV Light	Flow
April 25, 2006: Alky and Gas Con Unit							
Dye Introduction Locations							
Alkylation	0811	Sewer hub near AE44	8 ounces	Green	N/A	N/A	Adequate flow from water hose to ensure dye reached junction box A1
Observations							
MH4	0843	MH4 was observed	N/A	N/A	Dye was not observed	Sample was not collected	Insufficient amount of water for sample
Junction box CBZ-25	0913	Junction box CBZ-25 was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
MH13	0917	MH13 was sampled	N/A	N/A	Dye was not detected	Light green hue	Note: no flow was observed in MH13
MH4	NR	MH4 was observed	N/A	N/A	Dye was not observed	Sample was not collected	Adequate flow from water hose to ensure flow through storm sewer system
MH13	NR	MH13 was observed	N/A	N/A	Dye was not observed	Sample was not collected	Adequate flow from water hose to ensure flow through storm sewer system
Dye Introduction Locations							
Gas Con	1438	Drain hub near G-P6	16 ounces	Red	N/A	N/A	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
Observations							
Junction box G4	1504	Junction box G4 was sampled	N/A	N/A	Dye was detected	Red dye fluoresced brightly	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
MH17	1505	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
MH17	1535	MH17 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from unidentified sources
April 26, 2006: Crude Unit							
Dye Introduction Locations							
Crude	1140	Process sewer pump drain hub for CP41B	16 ounces	Green	N/A	N/A	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
Observations							
Junction box C2	1145	Junction box was C2 observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
Junction box C3	1146	Junction box C3 was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
Junction box C10	1200	Junction box C10 was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
MH6	1231	MH6 was sampled	N/A	N/A	Dye was not detected	Light green hue	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
MH6	1412	MH6 was sampled	N/A	N/A	Dye was not detected	Unconfirmed	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
Dye Introduction Locations							
Crude	1532	Process sewer pump drain hub for CP41B	32 ounces	Red	N/A	N/A	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
Observations							
Junction box C2	1532	Junction box C2 was observed	N/A	N/A	Dye was observed	Sample was not collected	Adequate flow from process drains ensuring dye disbursement throughout process sewer system
MH6	1608	MH6 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
MH6	1611	MH6 was sampled	N/A	N/A	Dye was not detected	Light green hue	Adequate flow from water hose to ensure flow through storm sewer system
MH6	1650	MH6 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
April 27, 2006: Alky and Platformer Units							
Dye Introduction Locations							
Alkylation	0858	Sewer hub near AE44	48 ounces	Red	N/A	N/A	15 minutes of flow from water hose to ensure dye reached junction box A1
Observations							
MH13	0934	MH13 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
MH4	0953	MH4 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
MH13	1057	MH13 was observed	N/A	N/A	Dye was not detected	Sample was not collected	Adequate flow from water hose to ensure flow through storm sewer system
MH4	1102	MH4 was observed	N/A	N/A	Dye was not detected	Sample was not collected	Adequate flow from water hose to ensure flow through storm sewer system
Dye Introduction Locations							
Platformer	1452	Drain hub P-P2B near Reactor Charge Pump	32 ounces	Red	N/A	N/A	Adequate flow from water hose to ensure dye disbursement throughout the process sewer system
Observations							
MH6	1521	MH6 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
MH6	1523	MH6 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system
MH6	1538	MH6 was sampled	N/A	N/A	Dye was not detected	Dye was not detected	Adequate flow from water hose to ensure flow through storm sewer system

Notes
NR denotes Not Recorded

FIGURES



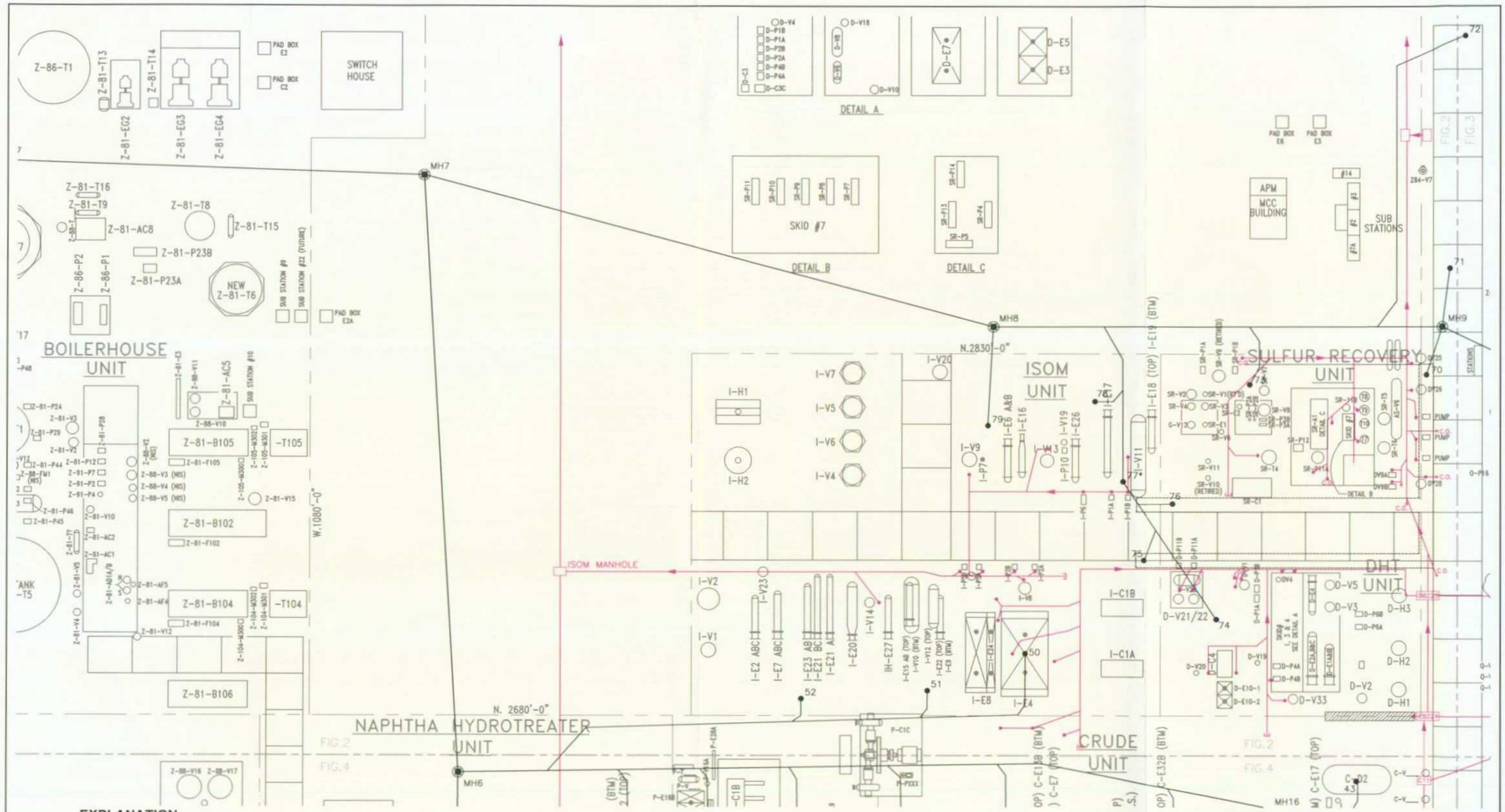
Rev.	Date	Description	By	Chk'd
B	10/9/06	SECOND ISSUE FOR CLIENT REVIEW	REP	RA
A	6/2/06	ISSUE FOR CLIENT REVIEW	DJR	RA
		REVISIONS		

Drawn By: REP | Checked By: RA | Scale: 1" = 80' | Date: 10/9/06

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307.745.7474 (F) 307.745.7729

FIGURE 1
STORMWATER / NON-PROCESS WASTEWATER SEWER SYSTEM 2006
GIANT REFINING COMPANY
CINIZA REFINERY
GALLUP, NEW MEXICO

File: 072STORMSEWER | Rev: B



EXPLANATION

- MH7 — STORM SEWER MANHOLE AND DESIGNATION (15)
- 52 — STORM SEWER DRAIN AND DESIGNATION (78)
- STORM SEWER PRIMARY PIPING RUN (14)
- STORM SEWER SECONDARY PIPING RUN (70)
- DRAIN GRATE SYSTEM
- PROCESS DRAIN SYSTEM

N

0 40'

NOTE:

1. * INDICATES ITEM NOT FOUND IN FIELD SURVEY
2. SEWER MANHOLE, DRAIN, AND PIPING LOCATIONS ARE APPROXIMATE

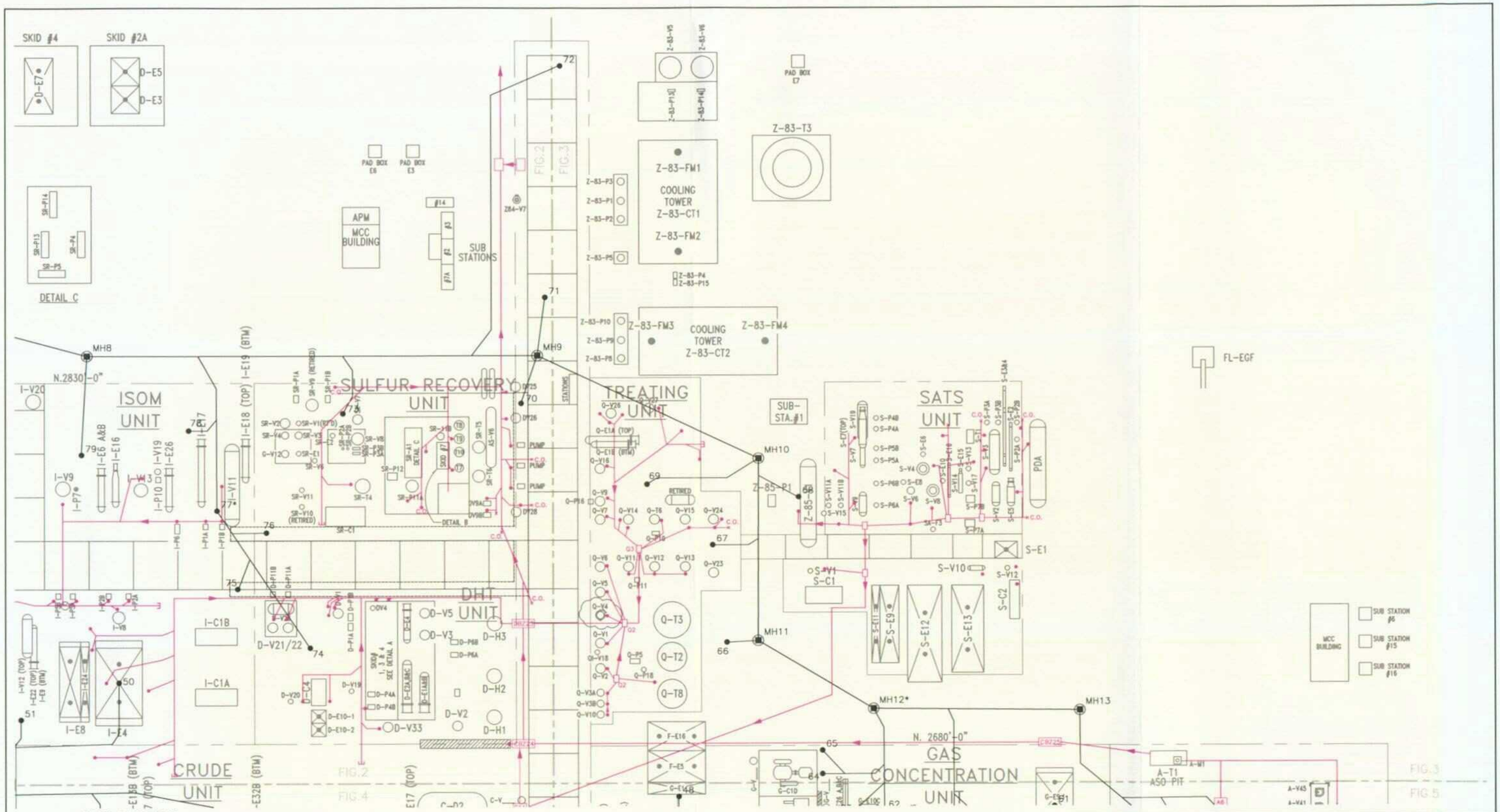
Rev.	Date	Description	By	Chk'd
B	10/9/06	SECOND ISSUE FOR CLIENT REVIEW	REP	RA

REVISIONS

Drawn By: REP | Checked By: RA | Scale: 1" = 40' | Date: 10/9/06 | File: 072STORMSEW2006 | Rev: B

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 2
STORMWATER / NON-PROCESS WASTEWATER SEWER SYSTEM 2006
GIANT REFINING COMPANY CINIZA REFINERY GALLUP, NEW MEXICO



EXPLANATION

- MH11 — STORM SEWER MANHOLE AND DESIGNATION (15)
- 48 — STORM SEWER DRAIN AND DESIGNATION (78)
- STORM SEWER PRIMARY PIPING RUN (14)
- STORM SEWER SECONDARY PIPING RUN (70)
- DRAIN GRATE SYSTEM
- PROCESS DRAIN SYSTEM

NOTE:

1. * INDICATES ITEM NOT FOUND IN FIELD SURVEY
2. SEWER MANHOLE, DRAIN, AND PIPING LOCATIONS ARE APPROXIMATE

N

0 40'

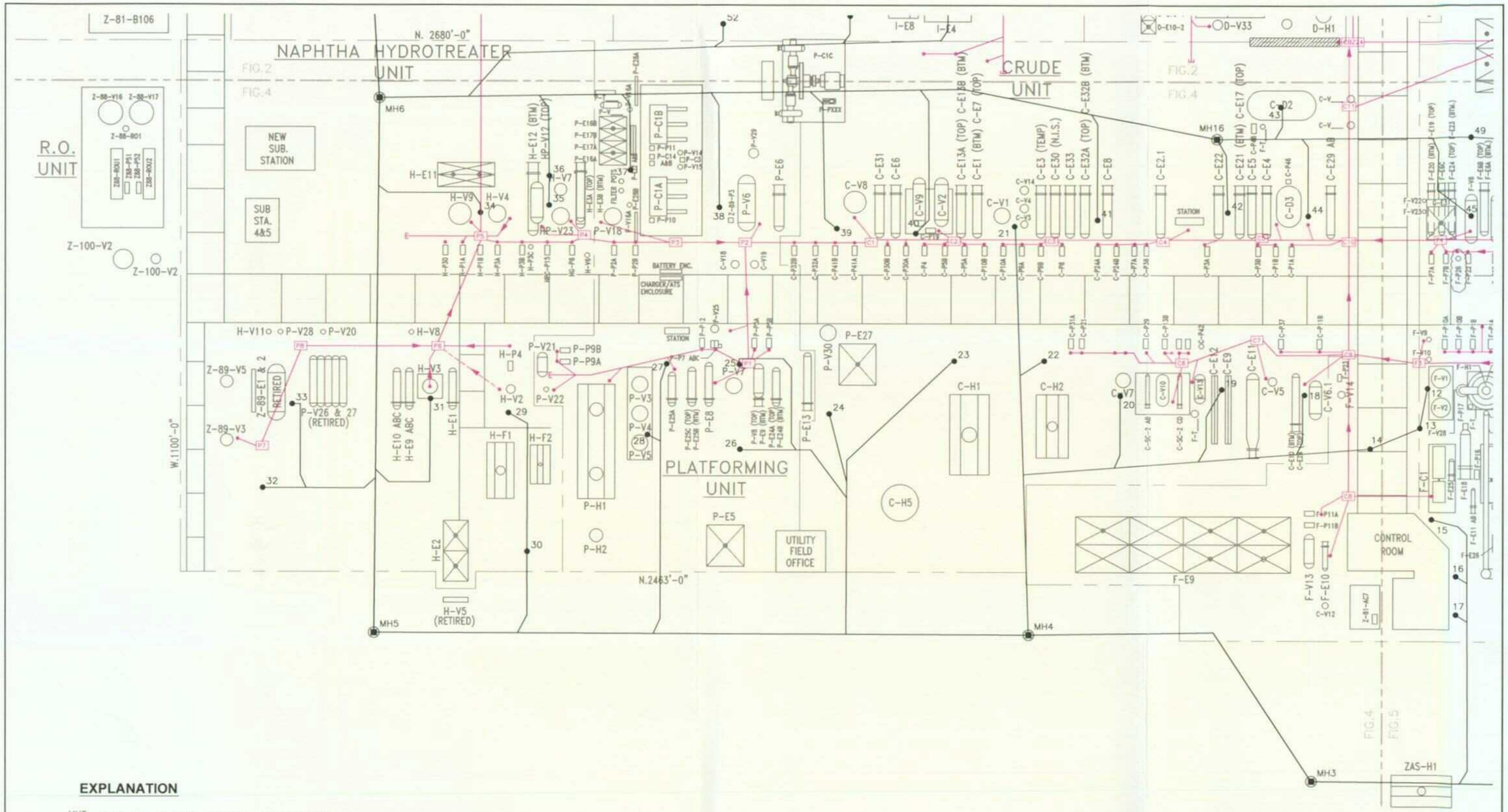
Rev.	Date	Description	By	Chk'd
B	10/9/06	SECOND ISSUE FOR CLIENT REVIEW	REP	RA

REVISIONS

Drawn By: REP | Checked By: RA | Scale: 1" = 40' | Date: 10/9/06 | File: 072STORMSEW2006 | Rev: B

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 3
STORMWATER / NON-PROCESS WASTEWATER SEWER SYSTEM 2006
GIANT REFINING COMPANY CINIZA REFINERY GALLUP, NEW MEXICO



EXPLANATION

- MH5 — STORM SEWER MANHOLE AND DESIGNATION (15)
- 33 — STORM SEWER DRAIN AND DESIGNATION (78)
- STORM SEWER PRIMARY PIPING RUN (14)
- STORM SEWER SECONDARY PIPING RUN (70)
- DRAIN GRATE SYSTEM
- PROCESS DRAIN SYSTEM
- ABOVE GROUND PROCESS DRAIN SYSTEM

N

0 40'

NOTE:

1. * INDICATES ITEM NOT FOUND IN FIELD SURVEY
2. SEWER MANHOLE, DRAIN, AND PIPING LOCATIONS ARE APPROXIMATE

Rev.	Date	Description	By	Chk'd
B	10/9/06	SECOND ISSUE FOR CLIENT REVIEW	REP	RA

REVISIONS

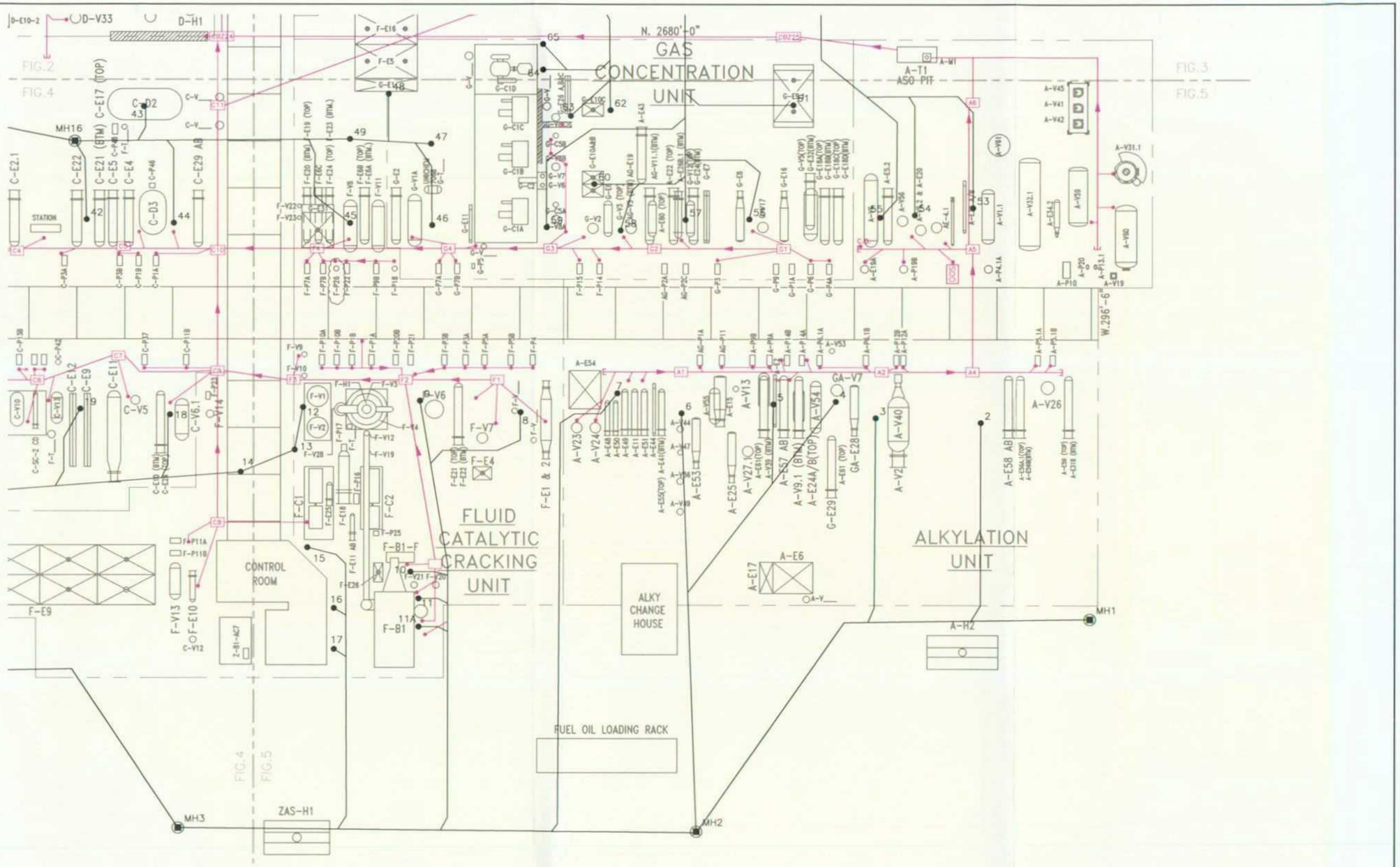
Drawn By: REP | Checked By: RA | Scale: 1" = 40'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

Date: 10/9/06

FIGURE 4
STORMWATER / NON-PROCESS WASTEWATER SEWER SYSTEM 2006
GIANT REFINING COMPANY CINIZA REFINERY GALLUP, NEW MEXICO

File: 072STORMSEW2006 | Rev: B



EXPLANATION

- MH3 — STORM SEWER MANHOLE AND DESIGNATION (15)
- 17 — STORM SEWER DRAIN AND DESIGNATION (78)
- STORM SEWER PRIMARY PIPING RUN (14)
- STORM SEWER SECONDARY PIPING RUN (70)
- DRAIN GRATE SYSTEM
- PROCESS DRAIN SYSTEM

NOTE:

1. * INDICATES ITEM NOT FOUND IN FIELD SURVEY
2. SEWER MANHOLE, DRAIN, AND PIPING LOCATIONS ARE APPROXIMATE

Rev.	Date	Description	By	Chk'd
B	10/9/06	SECOND ISSUE FOR CLIENT REVIEW	REP	RA

REVISIONS

Drawn By: REP | Checked By: RA | Scale: 1" = 40'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

Date: 10/9/06

FIGURE 5
STORMWATER / NON-PROCESS WASTEWATER SEWER SYSTEM 2006
GIANT REFINING COMPANY CINIZA REFINERY GALLUP, NEW MEXICO

File: 072STORMSEW2006 | Rev: B

Figure 6: Green oil residue on an FCCU process drain. Picture taken September 22, 2006.

ATTACHMENTS

Sewer Training Outline

The following items will be discussed during the Storm Sewer Training sessions:

- Review physical layouts of the storm sewer and process sewer systems most importantly highlighting the locations of storm sewer drains on the storm sewer diagrams. All storm sewer drains are painted green so as not to be confused with the process sewer drains.
- Review Section 5, Storm Sewer Drain Location Conclusions of the Trihydro report. Emphasize that the storm sewers are strictly for storm water and nothing else. Storm sewers that showed oil staining during the study particularly must be addressed in such a manner that oils will not enter the storm sewer system.
- Review the Recommendation Sections 6.1 and 6.2 in the Trihydro report. Proper draining procedures include, but are not limited to, routing of process water or other liquids through a hose or other suitable conduit to a process sewer drain thereby preventing liquids from flowing to a storm sewer drain. Proper draining procedures also include the routing of process water to a process sewer drain at a rate such that the process sewer drain does not become overwhelmed, resulting in a spill that may flow to a storm sewer drain. Proper draining procedures should be followed when draining all types of equipment
- Review Action plan letter with employees. Emphasize that employees need to regularly inspect process sewer drains for drain plugging. If process or storm water sewer drain plugging is observed, the plugging location must be immediately reported to the shift supervisor who will write a Level 5 work order to correct the plugging.
- Emphasize the importance of not allowing any piping to ever be routed to a storm drain and vigilance toward protection of the storm drains from entry of oil and other contaminants. Emphasize the importance of regulatory compliance.

Attachment To 5/26/88
Giant Valley